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ASSTRACT

Examined with 23 children (7-10 years old) with minimal brain dysfunction was the relation of handedness functions to early and diffuse brain damage. Ss and a group of 25 controls were given the Harris Tests for Lateral Dominance and the Halstead Finger Oscillation test. Results indicated a lowered performance level for both right and left hands and a significant reduction in the occurrence of right handedness coupled with a comparable increase in mixed dominance for the Ss. (Author/IM)

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Absence of Lateral Dominance and Handedness in Children with Minimal Brain Dysfunction.

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The development of cerebral dominance may represent a particularly vulnerable aspect of cerebral function. If so, children with minimal brain dysfunction (MBD) should display not only a general functional impairment but additionally, a relatively greater impairment of lateralized functions. In order to test this hypothesis with respect to handedness the performance of MBD and normal children was compared on a series of standardized tests.

Method

Subjects: Ss consisted of 23 boys and girls with the diagnosis of minimal brain dysfunction and 25 normal controls. Their ages ranged from seven to ten years. All children lived at home but the children with MBD attended a special school.

Procedure: The tests consisted of the Halstead Finger Oscillation Test and six tests of lateral dominance selected from the Harris Test Series. These were: knowledge of right and left, hand preference, simultaneous writing of digits, handwriting time for each hand, tapping test, and foot dominance. The tests were given individually. The results were analyzed by chi square, Fisher's exact t and a split block design analysis of variance.

Results

The results consistently revealed a significant difference in the strength of lateralization as well as a general impairment of performance, irrespective of lateralization, in the MBD group. On the Halstead Finger Oscillation Test (fig. 1) the normal group showed clear laterality dif-

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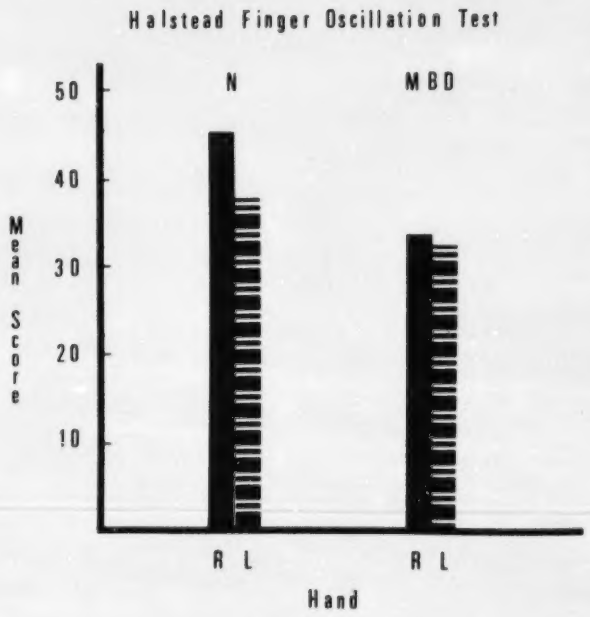
Halstead Finger Oscillation Test
N
MBD
50
40
30
20
10
Mean Score
R L
R L
Hand

ferences, right hand performance being significantly superior to left hand performance ($p < 0.005$). In the MBD group there was no difference between right and left hands. Moreover, their performance was significantly poorer for either hand. On the more difficult Harris Tapping Test (table 1) the same loss of lateral dominance and general performance impairment were observed. When asked to write simultaneously with each hand the numbers 1 through 12, the MBD group made many more reversals with their right hand than did the normal group; for the left hand the relationship tended to be reversed but did not reach significance (table 2). There was no difference in the speed with which Ss of the two groups wrote their name with each hand. However, a significantly greater number of MBD Ss wrote faster with their left hand whereas the converse held true for the right hand (chi square<0.01). Knowledge of right and left was also superior in the normal group (table 3). All errors in that group could be assigned to three Ss, all other normal Ss achieved a perfect score. By contrast, almost one half of the MBD Ss showed signs of right-left confusion. Finally, when tested for foot dominance, right foot preference was nearly universal in the normal group but it was clearly demonstrable in only one half of the MBD group.

Conclusions

These results indicate two characteristics of MBD performance on these tests. There is first, a general lowering of performance levels which affects both the right and the left hand; presumably this reflects a bilateral disturbance of cerebral functions. Superimposed on the general impairment, however, is a proportionately greater impairment of right hand performance. This suggests that the development of cerebral dominance is particularly vulnerable, at least for such functions as handedness.

Table 1. Number of subjects in each group superior with right or left hand or showing no difference on tapping test

	Right Hand Superior	Left Hand Superior	No Difference	n
Normal	23	2	0	25
MBD	9	9	2	20

Chi square: $p < 0.005$

Table 2. Mean number of reversal for right and left hand

	Right	Left
Normal	0.2	3.3
MBD	1.7	2.5

Table 3. Number of subjects in each group performing with errors and without errors on knowledge of right and left

	No Errors	With Errors	n
Normal	22	3	25
MBD	12	11	23

Chi-square: $p < 0.025$

ABSTRACT

Absence of Lateral Dominance and Handedness in Children with Minimal Brain Dysfunction

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To determine whether handedness functions were particularly vulnerable to early and diffuse brain damamge, the Harris Tests for Lateral Dominance and the Halstead Finger Oscillation test were given to a group of seven to ten year old children with minimal brain dysfunction and to a normal control group. The results, significant on all tests, indicated a lowered performance level for both right and left hands. In addition, all tests revealed a significant reduction in the occurrence of right handedness coupled with a comparable increase in mixed dominance.